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Research Summaries

The Economics of School Reform

Caroline M. Hoxby*

Structural reforms for elementary and secondary (K–12) schools are being seriously debated these days. The majority of U.S. states have now enacted at least some form of choice among public schools, for example a charter school program, open enrollment among school districts, or choice within the district. While state legislatures have been much less inclined to enact programs such as vouchers and tax incentives that increase parents' ability to choose private schools, private donors particularly like voucher programs.¹

In addition, there have been major changes in the structure of public school finance in America over the last 30 years. Increasingly, school finance has been centralized at the state level and has been affected strongly by "school finance equalization" (a term that encompasses a variety of methods for redistributing monies from "property-rich" to "property-poor" school districts).²

It is clear why Americans are so interested in structural school reform for K–12 education. On a per-pupil basis, American public education is the most expensive system in the world. Yet, American K–12 students perform only moderately well on international tests of mathematics, science, and language arts achievement. The per-pupil expense for K–12 education has grown by nearly 80 percent (after adjusting for inflation) since 1970, yet student achieve-

ment has been almost flat over the period.³ Since 1970, most states' school finance systems have been revised in order to target more funds to disadvantaged students. As a result, differences in funding have narrowed, but there has been very little narrowing of the differences in the outcomes of students from advantaged and disadvantaged backgrounds.⁴

There are three reasons why economics is valuable for the analysis of school reform. First, econometric methods and evaluation techniques developed over the last decade (especially in labor and public economics) are very useful for analyzing school reforms. Second, many of the puzzles in K–12 schooling are related to financing, and most structural school reforms are loosely based on economic arguments. For instance, school choice is related to the competitive-market metaphor, and school finance equalization is based loosely on progressive taxation of income and wealth. These arguments (and the related policies) need to be made rigorous and subjected to empirical examination.

Third, economists broadly agree that educational systems ought to solve the problem of investment in human capital, which involves some capital market failures and spillovers.⁵ This consensus is important because it facilitates analytic progress. In contrast, popular and legal debates about education often become mired in struggles over whether it is best to maximize enrollment, maximize achievement, maximize the equality of achievement among students, or do something else entirely. In my own work on school reform, I have attempted to bring all three advan-

tages of economics to bear: modern empirical methods, rigorous economic argument, and a consistent focus on solving the human capital investment problem.

Empirical Evidence on School Choice

Analysis of the various reforms should begin with the two basic, traditional forms of school choice in the United States: choice among public school districts and choice between public and private schools. These two existing options give certain parents a substantial degree of choice, and the effects of their choices are useful for predicting the effects of other reforms. Moreover, empirical evidence on how traditional choice affects students is the only way we can learn about the general equilibrium and long-term effects of school choice.

For instance, several studies (including one I am conducting) are currently evaluating charter and voucher schools, using randomized "treatment" and "control" groups of students.⁶ These studies can inform us about the effects of voucher or charter schools only on those students who actually use them. The studies tell us nothing about the effects that a widespread voucher or charter school policy would have on public school attendance or on how public schools would respond to competition. But analysis of the two traditional forms of choice does inform us about these crucial issues. Furthermore, school choice reforms are always layered on top of traditional choice, and households will make different decisions about traditional choices as the reforms are added.

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Evidence on Choice Among Public School Districts

Choice among public school districts occurs when households can pick their residences. To analyze the effects of such choice, I compare metropolitan areas among which there are long-term differences in parents' ability to choose a school district.⁷ Ease of choice depends both on the number of districts in the area and on the evenness with which enrollment is spread over those districts. Choice is easier in a metropolitan area in which parents choose among 20 districts of equal size than in an area where three-quarters of enrollment falls into one of 20 districts, which in turn is easier than in an area with only one school district.

Great variation exists among metropolitan areas in the degree of choice that is available. For instance, Boston has 70 school districts within a 30-minute commute of the downtown area, while the much larger Miami metropolitan area has only one school district (Dade County). These differences are largely a result of history and geography, but a district's enrollment can also reflect its success: an efficient district attracts a disproportionate share of metropolitan area enrollment and gets other districts to consolidate with it. In simple comparisons among metropolitan areas, this introduces a bias against finding that greater choice among districts has positive effects.

To obtain unbiased estimates, I identify geographic and historical factors that increase a metropolitan area's tendency to contain many, small, independent school districts but that are unrelated to contemporary public school quality. For example, I use the fact that metropolitan areas with more streams have more natural barriers and boundaries;

because they increase students' travel time to school, they may cause the lines drawn to define smaller districts. The resulting (IV) estimates based on cross-section data (including rich demographic data on each school) allow me to identify the causal effect of greater availability of public school districts, while controlling for a wide range of background variables and differentiating the effects of choice on self-segregation.

I find that a one standard deviation change in a Herfindahl index of enrollment concentration, which corresponds to a substantial increase of choice among districts (for instance the difference between having 4 and 100 equal-sized districts) causes a statistically significant but small (2 percentile points) improvement in students' reading and math scores.⁸ However, school efficiency improves dramatically, because the same increase in choice causes schools' per-pupil costs to fall by 17 percent. The powerful implications occur because the effects are opposite in sign: an increase in choice improves student achievement even while accomplishing substantial cost savings.

Choice among districts turns out to have little effect on the degree of segregation among students. The reason is that, empirically, the degree of racial, ethnic, and income segregation that a student experiences is related to the degree of choice among schools in a metropolitan area, but not to the degree of choice among districts. In other words, students are just as segregated in metropolitan areas that contain few districts as they are in metropolitan areas that contain many districts. Households sort themselves into neighborhoods inside districts; neighborhoods and schools are small enough relative to districts that district boundaries have little effect on segregation.

This result demonstrates how important it is to compare realistic alternatives. The realistic alternative to a metropolitan area with a high degree of choice among districts is not a metropolitan area in which all schools are perfectly desegregated and every student is exposed to similar peers. The realistic alternative is a metropolitan area with a low degree of choice among districts and a substantial degree of segregation among schools.

In another study that examines how parents exercise choice, I find that parents who have more choice within the public sector favor schools with strict disciplinary and academic atmospheres. They are also more involved in their children's schooling: a single standard deviation increase in the degree of choice causes a 33 percent increase in the probability that a parent visits his child's school in the course of a year.⁹

Choice among public school districts is especially helpful for analyzing charter school and open enrollment reforms because such analyses require that we know: 1) on what bases parents choose among schools; 2) how public schools differentiate themselves, given that they are subject to public scrutiny and public constraints; 3) whether public providers react to competition for students by improving their programs; 4) how the degree of choice among public providers affects parents' willingness to pay for private school alternatives; and 5) how students self-segregate among schools when they can choose but receiving schools cannot discriminate amongst them. The main limitation of using choice among public school districts to understand charter school and open enrollment reforms is that the reforms' financial arrangements typically have different properties than the finance that results from traditional choice.

Empirical Evidence on Choice between Public and Private Schools

I have also studied the effects of the second way in which parents traditionally exercise choice: enrolling their children in private schools.¹⁰ The schooling offered and the tuition charged by private schools in the United States vary tremendously. Approximately 90 percent of private school students attend schools affiliated with religious groups, but these schools have tuitions that range from token (“\$100 or what parents can pay”) to over \$10,000. The remaining 10 percent of private school students attend “independent” schools, which are disproportionately likely to be exclusively college-preparatory, and which charge more than \$5,000 per year in tuition.

More than 65 percent of U.S. private school students attend a school affiliated with the Catholic Church, although these vary from modest parochial elementary schools to elite, college-preparatory schools. The modal private school student in the United States attends a Catholic school that charges a tuition of about \$1,000 dollars (elementary school) or \$2,250 (secondary school) per year.

American private schools typically subsidize tuition with monies from donations or (less often) income from an endowment. The share of schooling cost that is covered by subsidies is larger in schools that serve low-income students, but even the relatively expensive private schools subsidize tuition. For instance, tuition revenue covers between 55 and 75 percent of the costs of the average Catholic school (depending on the type), but tuition revenue also covers only 80 percent of the costs of expensive Friends schools. Private schools that charge highly subsidized tuition in low-income communities frequently must ration school places.

In a paper that attempts to deter-

mine the effects of private school competition on public schools, I compare metropolitan areas with and without substantial private school enrollment. Metropolitan areas have private school attendance rates that vary from, a low of 3 percent to a high of 33 percent of students. (Private school attendance of 10 to 15 percent is typical.) This variation is created by historical accident, the donations available for subsidizing private schools in an area, and the quality of public schools. In particular, low quality public schools raise the demand for private schools. Thus, simple comparisons will confound the effect of greater private school competitiveness with the increased demand for private schools in areas where the public schools are of poor quality.

To obtain unbiased estimates, I use the fact that a denomination's private schools can provide more tuition subsidies if they inherited an endowment (which may be partly in buildings and land) from a population that was historically comprised mainly of the affiliated denomination. I use metropolitan areas' historical religious population densities as instrumental variables that shift the supply of private schools but are not related to idiosyncratic differences in recent public school quality. I also control for a variety of background factors that might be correlated both with the demand for private schools and with public school quality. In particular, I can control for a household's denomination—so that if being Catholic, say, affects a household's demand for public school spending or the achievement of its children, then this effect is not confounded with the effect of greater availability of Catholic schools.

My estimates suggest that if private schools in an area receive sufficient resources to subsidize each student's tuition by 1000 dollars, then the achievement of public school stu-

dents is higher, regardless of whether it is measured by test scores, ultimate educational attainment, or wages. Mathematics and reading scores improve by 8 percentile points; there is an 8 percent increase in the probability of graduating from high school, and a 12 percent increase in the probability of getting a baccalaureate degree; wages (for those who work, later in life at ages 29–37) improve by 12 percent.

My estimates indicate that competition from private schools does not have a significant effect on public school spending per pupil. This is because there are offsetting forces. On the one hand, an increased supply of private schools tends to draw parents into the private sector who might have supported generous public school spending had their children remained in public schools. On the other hand, the students who are drawn into the private school sector would otherwise have had to be educated at public expense.

Like the effects of choice among public school districts, the effects of private school competition on segregation of students are small and statistically insignificant. This is because, first, public schools are already quite segregated along lines of race, ethnicity, parents' income, and students' performance. Second, private school competition typically increases segregation slightly in public schools and decreases segregation slightly in private schools.

Evidence on traditional private school choice is most useful for predicting the effects of vouchers and tax credits. However, policymakers can more easily control the fiscal impact of vouchers and tax credits on public schools than the fiscal impact of traditional private school choice on public schools. The size and funding of the vouchers or tax credits determines their direct fiscal effect. For instance, most vouchers proposed thus far have been consider-

ably smaller than per-pupil spending in the sending public school district—so that every marginal student who uses a voucher to attend private school leaves monies to be spread among the remaining students.

I also find that parents act as though choice among public school districts and choice between public and private schools can be substitutes to some degree.¹¹ A single standard deviation increase in the degree of choice among public school districts lowers the share of children who attend private schools by about 1 percentage point (or, equivalently, by about 10 percent).

Parents also may be willing to substitute different forms of school choice reforms for one another, to some degree. For instance, a charter school program is likely to reduce the demand for voucher and open enrollment programs.

School Reform

Along with increasing empirical evidence, there have been significant advances in recent years in the economic theory of school reform. Specifically, three types of theories have developed, about 1) the allocative efficiency effects, or how students sort themselves among schools, the average level of school funding, and which schools receive funds; 2) the productive efficiency effects, that is, whether schools use funds efficiently or extract rents; and 3) the effects on income inequality, intergenerational income mobility, and macroeconomic growth.

Theoretical analysis of the allocative efficiency consequences of school reform evolves naturally from the literature on local public goods that is associated with Tiebout. In two papers, Nechyba and Epple and Romano have analyzed the implications of vouchers and open enrollment for housing markets, voting on property tax rates, and the allocation

of students among schools.¹² This type of analysis is difficult because it must be completely general equilibrium, and the housing market and politics must both “clear”—that is, a political mechanism for choosing property tax rates must be specified, allowed to function, and allowed to affect the housing market.

From this literature, we learn that the allocative consequences of most school choice reforms are ambiguous. For example, reforms affect mainly the type, not the level of segregation that occurs. If a voucher, charter school, and open enrollment plan all increase school segregation for a particular attribute (such as ability, income, or race), then the same plan decreases residential segregation along that line. Moreover, an increase in school segregation for one attribute (say, ability) might decrease segregation for other attributes (say, income) and affect school funding, in a direction which depends on the spillover function. Only empirical evidence that enables us to weigh magnitudes can help us resolve these ambiguities and allow us to rank types of school choice as solutions to the problem of investment in human capital. Inherent ambiguity might be the reason that both forms of traditional choice have statistically insignificant effects on student segregation and why private school competition has a statistically insignificant effect on public school funding.

Theory illuminating the effect of school reform on productive efficiency is at a much less advanced stage than theory on allocative efficiency. Yet, whether schools are using funds efficiently is an increasingly important question, especially because the quandaries of K–12 education, described in the opening paragraphs, appear to be problems of productivity rather than of allocation. That is, the United States already supports a high average level of

school spending (either as a share of income or compared to other advanced economies), and the states have increased their aid to districts that serve disadvantaged children almost continually over the last 30 years.

Fortunately, the effects of school reform on productive efficiency are relatively straightforward compared to the effects on allocative efficiency. Productive *inefficiencies* are made possible largely by mobility costs and similar barriers that lead to a group in a school district of incumbent residents from whom rent can be extracted. While it is difficult to predict how a school reform will affect people's choice of residence, where students attend school, and how people vote on property taxes (for all the general equilibrium reasons described earlier); it is usually quite easy to characterize how a school reform affects mobility costs. One of my papers which uses a principal-agent framework shows, for example, that an increased degree of traditional choice among public school districts, combined with conventional American local school finance, reduces the rent that a school district's bureaucrats can extract from residents.¹³ The logic behind this is that house prices in a metropolitan area with many similar school districts competing for residents provide a lot of information about school quality. Because local school budgets depend on local house prices (through the property tax), the information about school quality that is embodied in house prices is used to reward school bureaucrats through the size of their budgets.

Extending the argument to school reforms, including charter schools, vouchers, and open enrollment programs, is not difficult. All of these programs substantially lower mobility costs among schools because they detach school choices from residen-

tial choices, and the largest mobility costs are associated with residential moves. School choice programs also provide direct links between parent choices and school finances, as opposed to the indirect link through the housing market.

Appropriate financial arrangements are crucial for school reforms. The ideal financial arrangements provide consistent and politically stable rewards for successful schools—the rewards must be generous enough to encourage expansion of successful schools and contraction of unsuccessful schools. Many actual school reforms have financial arrangements that are poorly designed. Indeed, some open enrollment plans' financial arrangements encourage perverse behavior, such as fiscal free-riding: that is, purposely locating a school in a district with low property taxes which borders on a district with high property taxes and generous school spending, and then using an open enrollment plan to free-ride on taxpayers in the high property tax district. In the long run, fiscal free-riding blunts everyone's incentives to support public school funding.

Recent work by Benabou and Boldrin also links school reform to macroeconomic growth, the distribution of income, and intergenerational income mobility.¹⁴ They suggest that the structure of school choice and school finance both influence allocation—that is, the sorting of students among schools and the level and distribution of school spending. These allocative outcomes have consequences for the nation's overall level of human capital, for whether investments in human capital are distributed efficiently among people or on the basis of some arbitrary factor like parents' income, and for the level of human capital spillovers generated by a given level of financial investment in human capital. Unfortunately, this macroeconomic literature

shares the difficulties of the microeconomic literature on allocative consequences of school reform: the consequences are ambiguous because school choice changes the kind, not the level, of segregation. The macroeconomic literature also has yet to absorb fully the fact that households do not distribute themselves in a perfectly desegregated way, even when there is no school choice and there is centralized finance. Indeed, quantitatively important, macroeconomic consequences of school reform are not likely to occur through changes in allocative efficiency and are more likely to occur through changes in productive efficiency.

I have investigated the relationship between income inequality and school funding using Census and administrative data at the level of the school district.¹⁵ For Massachusetts, Illinois, and California at decade intervals from 1900 to 1990, I find that inequality in school funding fluctuates with changes in inequality of national income. Decades of increasing income inequality, such as the 1930s and 1980s, exhibited increases in school funding inequality (which were somewhat smaller than the increase in income inequality). Decades of decreasing income inequality, such as the 1940s and 1950s, showed decreasing inequality in school funding. I find no evidence of the reverse relationship—that is, that inequality in school funding for a generation translates into greater income inequality for that generation as adults. The fact that there is no evidence for this relationship does not imply that it does not exist. Rather, it suggests that the allocative consequences of the changes in school finance that have occurred over the twentieth century are small when compared to the powerful effect of the income distribution on the school spending distribution.

Related Points: Fiscal Independence, Teachers' Unions, and Higher Education

Up to this point, I have only mentioned in passing the financial implications of school choice, and I have mainly discussed school districts as though they were always fiscally independent. In fact, as I show in two recent papers, this is far from true.¹⁶ In 1950, the typical American school district raised more than 65 percent of its funds from a local tax base. By 1990, the typical district raised just under 40 percent of its revenue this way. Moreover, state aid increasingly has switched from being effectively "lump sum" (so far as school districts are concerned) to being a marginal tax on school districts' locally raised revenue.

In my work on school finance equalization, I use the states' school finance formulas to calculate the marginal tax price of local school spending for each school district in the United States in 1972, 1982, and 1992. I show that many school finance equalization schemes create marginal taxes on the raising of local revenue for schools, and that there generally has been a substantial decrease in the degree to which districts are fiscally independent. One consequence of this is that districts are taxed systematically on any increases they make in productive efficiency. In other words, a state that reduces its districts' financial independence (especially at the margin) also reduces the districts' incentives for productive efficiency, even if choice among public school districts is easy. For instance, I find that in California, where (since the Serrano II decision) districts have almost no financial independence, the positive effects of choice on student achievement and cost savings are reduced by more than half (making them statistically insignificant).¹⁷

How does a school district become more efficient in an environment with more school choice? I attempt to answer this question in part in a study of teacher unionization.¹⁸ I use panel data on over 90 percent of American public school districts in 1972, 1982, and 1992 in order to see what happened to teacher salaries, the pupil-teacher ratio, school spending, and student achievement when teachers unionized. I find that unionization generally reduces school efficiency, but does so by a smaller amount when the school faces competition from other public school districts and private schools. For example, unionization makes teachers' salaries rise less if the school district is in a metropolitan area with more choice among public school—whether or not student achievement is held constant—than if it is not.

I have also found it revealing to compare the structure of U.S. higher education to that of K-12 education. In a recent article on federal education policy, I discuss whether American colleges have high international stature and success with a wide range of students partly because they face a far more competitive market structure than elementary and secondary schools.¹⁹ College students are increasingly mobile and active "choosers" of their schools, and they carry their funds with them when they switch colleges. A much larger share of colleges than K-12 schools are private, nonprofit institutions. Also, most American colleges (including public colleges) are highly financially independent, so they must attract students in order to remain solvent. Still, colleges are not only successful with students from elite backgrounds: Breneman demonstrates that some colleges, especially community colleges, are inexpensive and successful providers of remedial schooling for students who need basic secondary school skills, such as writing, reading, and algebra.²⁰

Conclusion

We still do not have an "economics of school reform," but we are making steady progress on the empirical and theoretical analysis of school choice policies and school finance policies. By making loose economic arguments rigorous and bringing empirical evidence to bear, we have uncovered at least some important stylized facts, for instance, that the consequences of segregation on school reforms are more ambiguous than initially thought, and that the productivity consequences are clearer and probably of greater quantitative importance. Also, we are increasingly thinking jointly about school choice and school finance because financial incentives are the key to the way that school choice actually works. The structure of school choice and school finance are crucial to how individuals solve their human capital investment problems and how much a society increases its human capital over time. The implications for income inequality and macroeconomic growth are likely to keep economists interested for some time to come.

[Note: Most of Hoxby's papers cited here are available through her Web site, which can be reached through NBER's Web site (www.nber.org).]

¹ A.M. Tucker and W.F. Lauber, *School Choice Programs: What's Happening in the States*. Washington, D.C.: The Heritage Foundation Press, 1995. Also see J. Allen, *School Choice Programs: What's Happening in the States*. Washington, DC: The Heritage Foundation Press, 1992.

² C.M. Hoxby, "Is There An Equity-Efficiency Trade-Off in Local School Finance?" NBER Working Paper No. 5265, September 1995. See also S. Peltzman, "The Political Economy of the Decline of American Public Education," *Journal of Law and Economics*, (Winter/Spring 1993), 36(1-2), pp. 331-70.

³ C.M. Hoxby, "Are Efficiency and Equity in School Finance Substitutes or Complements?" *Journal of Economic Perspectives*,

(Fall 1996), 10(4), pp. 51-72. See also E. Hanushek and S. Rivkin, "Understanding the 20th Century Explosion in U.S. School Costs," mimeo, University of Rochester and Amherst College, 1994.

⁴ C.M. Hoxby, "Not All School Finance Equalizations Are Created Equal," mimeo, Harvard University, 1995. See also W. Evans, S. Murray, and R. Schwab, "Schoolhouses, Courthouses, and Statehouses After Serrano," *Journal of Policy Analysis and Management*, (January 1997), 16(1), pp. 10-37.

⁵ I certainly argue that there should be a consensus in C.M. Hoxby (*Journal of Economic Perspectives*, 1996—see n. 3). This is also the standard suggested by R. Benabou and by Raquel Fernandez and Richard D. Rogerson. See R. Benabou, "Heterogeneity, Stratification, and Growth: Macroeconomic Implications of Community Structure and School Finance," *American Economic Review*, (June 1996), 86(3), pp. 584-609.

⁶ See, for instance, J. Greene, W. Howell, and P. Peterson, "An Evaluation of the Cleveland Scholarship Program," *Harvard University Program in Education Policy and Governance Occasional Paper*, 1997.

⁷ C.M. Hoxby, "Does Competition Among Public Schools Benefit Students and Taxpayers," NBER Working Paper No. 4979, December 1994.

⁸ In practice, the most reliable measure of the ease of choice is a Herfindahl index based on districts' enrollment shares. The Herfindahl index incorporates both the number of districts and the evenness of districts' enrollment shares. A Herfindahl index based on enrollment shares is computed as follows. Suppose a metropolitan area has J school districts, which we index by $j=1, \dots, J$. Suppose each school district has a share, s_j , of total metropolitan area enrollment. Then, the index is:

$$\sum_{j=1}^J s_j^2$$

When there is no choice in a metropolitan area because there is only one public school district, the index is equal to 1. As more districts are added, and as enrollment is spread more evenly over those districts, the index gets closer to 0.

⁹ C.M. Hoxby, "When Parents Can Choose, What Do They Choose? The Effects of School Choice on Curriculum and Atmosphere," in *When Schools Make a Difference*, S. Mayer and P. Peterson, eds., Washington, DC: The Brookings Institution Press, 1998.

¹⁰ C.M. Hoxby, "Do Private Schools Provide Competition for Public Schools?" NBER Working Paper No. 4978, December 1994. See also C.M. Hoxby, "The Effects of Private School Vouchers on Schools and Students," in *Holding Schools Accountable*, H. Ladd, ed., Washington, DC: The Brookings Institution Press, 1996.

¹¹ C.M. Hoxby, "Do Private Schools Provide Competition for Public Schools?"

¹² D. Epple and R. Romano, "Public School Choice and Finance Policies, Neighborhood Formation, and the Distribution of Educational Benefits," mimeo, Carnegie-Mellon University and University of Florida, 1995. See also T.J. Nechyba, "Public School Finance in a General Equilibrium Tiebout World: Equalization Programs, Peer Effects, and Vouchers," NBER Working Paper No. 5642, June 1996.

¹³ C.M. Hoxby, "Tiebout and a Theory of the Local Public Goods Producer," NBER Working Paper No. 5265, September 1995 (revised 1997).

¹⁴ See the reference to R. Benabou, *American Economic Review*, 1996, in n. 5. See also M. Boldrin, "Public Education and Capital Accumulation," *Economic Theory Workshop Discussion Paper No. 1017*, 1993.

¹⁵ C.M. Hoxby, "How Much Does School Spending Depend on Family Income? The Historical Origins of the Current School Finance Dilemma," *American Economic Review, Papers and Proceedings*, 88(2), May 1998.

¹⁶ See C.M. Hoxby, *Journal of Economic Perspectives*, 1996, and "Not All School Finance Equalizations Are Created Equal," 1995.

¹⁷ C.M. Hoxby, "Does Competition Among Public Schools Benefit Students and Taxpayers?"

¹⁸ C.M. Hoxby, "How Teachers' Unions Affect Education Production," *Quarterly Journal of Economics*, (August 1996), 111(3), pp. 671-718.

¹⁹ C.M. Hoxby, "Where Should Federal Education Initiatives Be Directed? K-12 Education versus Higher Education," in *Financing College Tuition: Government Priorities and Social Priorities*, M. Koster, ed., Washington, DC: American Enterprise Institute Press, 1998.

²⁰ D. Breneman, "The Extent and Cost of Remediation in Higher Education," in *Brookings Papers in Education Policy*, D. Ravitch ed., Washington, DC: The Brookings Institution Press, 1997.

Developments in Pensions

Olivia S. Mitchell*

The share of the world's population over age 60 will triple between 1990 and 2030, exceeding 30 percent among developed countries by then. This massive demographic shift will force insolvency on many of the large unfunded public social security programs that evolved after World War II.

Are funded pension plans necessary for retirement system reform? This is one subject I explore in my research on pensions in developed and developing countries. In each case, I ask how pensions function, what effects they have on work and saving, and how pensions help public and private stakeholders to share the risks of old age. Ultimately, I am interested in how to design pension plans to increase their efficiency and

insulate them from a range of political and financial challenges.

Retirement Saving Adequacy in the United States

The U.S. situation brings some of these problems into focus very clearly. Our Old Age, Survivors, and Disability Insurance (OASDI) program under Social Security faces an unfunded obligation of approximately \$9 trillion. Fixing this shortfall would require either benefit cuts of about 25 percent or tax increases of approximately the same magnitude.¹ Such a massive change in the system portends ill for prospective retirees in the baby boom generation as well as current retirees. In a recent study using the Health and Retirement Survey (HRS), James Moore and I found that most Americans have saved too little to preserve their current consumption standards in retirement. This nationally representative and longitudinal study of respondents aged 51 to 61 in 1992 and their spouses describes multiple sources of household wealth and determinants

of old-age poverty for a group who are on the verge of retirement.

The HRS inquires about respondents' net housing and financial wealth describes employer-provided plans enabling us to calculate pension wealth and links data from the survey expected Social Security benefits derived from earnings records gathered from Social Security files.² We use the Social Security Administration's "intermediate" economic and demographic assumptions, and conclude that median total household wealth (that is, net financial wealth plus net housing equity, pension wealth, and Social Security wealth) for this group is approximately \$350,000. Pension benefits, net home equity, and net financial wealth each contribute about one fifth of the total, and anticipated Social Security benefits make up the remaining two fifths.

Is this enough money to retire on? Obviously the answer depends on one's benchmark; in our work, we ask how much additional saving would be required in order to retire at a specified age and to smooth consumption in retirement. Our analysis

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